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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/075,777

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Daniel P. Lawrence

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06/04/2004

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1751

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/075,777	LAWRENCE ET AL.	
Examiner	Art Unit	
Kallambella Vijayakumar	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-5, 7, 8, 10-15, 18, 19 and 43 is/are rejected.
- 7) ☒ Claim(s) 2, 6, 9, 16 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/06)
Paper No(s)/Mail Date _____
- 4) ☒ Interview Summary (PTO-d13)
Paper No(s)/Mail Date 05/11/04
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Detailed Action

- Acknowledge the response filed 03/18/2004 including the amendments to the claims, canceling of claims 20-42 and addition of new claim 43, in response to the office action mailed 12/18/2003. Claims 1-19 and 43 are currently pending with the application.
- Attempt to condition the application for allowance by amending the independent claim to include the limitations of indicated allowable claims with Anna Budde did not materialize.
- Applicant's arguments filed 03/18/2004 have been fully considered and found to be persuasive. After a careful consideration of the arguments filed with the response, the following rejections have been dropped:
 - 1). Claims 1-3, 5-7, 9, 12-14, 16, and 18 rejected under 35 U.S.C. 102(b) as being anticipated by Okada et al (US Patent # 5,705,098) in view of Dainippon (JP 08-231906).
 - 2). Claims 1, 3-6, 8-9, 12 rejected under 35 U.S.C. 102(b) as being anticipated by Taguchi (US Patent 3,349,055).
 - 3). Claims 1-19 rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (JP 11-302587) in view of Okada et al (US Patent # 5,705,098) further in view of Dainippon (JP 08-231906) or Kuwajima et al (US Patent 5,951,918).
- However the arguments were not persuasive in removing the following rejection of the *claims as amended* over Yoshimura et al that are being maintained for the following reasons:
 1. Claims 1, 3-5, 7-8, 10-12, 14-15, 18 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshimura et al (JP 11-302587) {cited in Office Action mailed 12/18/2003}

in view of Crowhurst et al (WO 96/17025) {IDS} and over the reasons given the office action mailed 12/18/2003.

Normally, only one reference should be used in making a rejection under 35 U.S.C. 102. However, a 35 U.S.C. 102 rejection over multiple references has been held to be proper when the extra references are cited to (SEE MPEP 2131.01):

- (A) Prove the primary reference contains an "enabled disclosure; "
- (B) Explain the meaning of a term used in the primary reference; or
- (C) Show that a characteristic not disclosed in the reference is inherent.

Applicants claim the composition of conductive ink comprising a dispersion of both the conductive particles and flakes and specific polymer in a solvent media.

Yoshimura et al teach the composition and making of a water based metallic ink comprising:

a). metal powder and flakes of aluminum bronze and brass, both leafing type and non leafing type flakes being used in the formulation, would meet the limitation of conductive flakes and conductive metal powder in the instant Claims-1, 14, 15 and 43 (Sec: 0019-0022).

b). conductive oxides of iron and titanium, and carbon black would meet the limitations of conductive powders in instant Claims-1, 7, 8, 9, 12, 18 and 43 (Section: 0024).

Applicants argue that Yoshimura does not teach the use of both particles and flakes in the ink composition that is not persuasive in view of a). and b).

c). an anionic polymer such as styrene-acrylic copolymer or styrene-maleic acid copolymer would meet the limitation of polymer in instant Claims-1, 3-4, 9 and 43 (Section: 0027),

- d). cellulose materials as binders would meet the limitations of instant Claims 10-11 (Section: 0033, 0041).
- e). water-soluble solvent for dispersion would meet the limitation of instant Claim-5. (Section: 0047-0048).
- f). Yoshimura do not disclose the information on the aspect ratio of the metallic flakes used in the ink composition or the acid value of the styrene-acrylic/maleic polymer.
- g). Applicants argue that aluminum need to be treated before use in aqueous solvents and ink may or may not have enough conductivity. Applicants further argue that sufficient amount of aluminum might not have been included in the composition to impart conductivity. Yoshimura et al disclose controlling of pH of the ink composition, which would minimize the surface oxidation of the metallic elements where by its metallic luster would be preserved (Sec: 0014), and it would be the examiners position that the conductivity of the flakes/ink would not be affected significantly due to this control in the formulation of the ink. Even if the aluminum or metal particles were treated with stearates that is known in the art, the stearates would dissolve in the solvent upon dispersion in the solvent media with controlled pH where by it would impart conductivity to the ink, and in fact, Crowhurst et al teach the use of fatty acid treated Al in making conductive inks (Page-5) and the viscosity of the conductive ink to range from 20-14,000 cps (pages 1,2,4). Yoshimura et al further suggest that there is no limitation on using other metallic flakes in the ink composition. Further, the resin, conductive fillers, additives and their ratios in the ink composition Yoshimura et al, and pH of the ink are almost identical those disclosed/claimed by the applicants (Specification: 0020, 0023,

0027, 0028, 0029, 0031, 0032), and conductivity of the ink would be inherent and would meet the limitations of conductive ink by the applicants in the instant claims. Impartation of any amount conductivity by the conductive fillers in the ink of would meet the limitations 'conductivity, in the instant claims.

All the limitations of the instant claims are met.

The reference is anticipatory.

- Applicant's arguments with respect to claims 1, 3-5, 7-8, 12-15, 18 and 43 have been considered but are moot in view of the new ground(s) of rejection.
- 2. Claims 1, 3-5, 7-8, 12-15, 18 and 43 are3 rejected under 35 U.S.C. 103(a) as being unpatentable over Sullivan (US Patent 4,826,631) in view of either Suster (US Patent 4,493,639), or Lochun et al (WO 00/33625){IDS} or Harrison et al (WO 97/48257){IDS} or Crowhurst et al (WO 96/17025) {IDS} or Okada et al (US Patent # 5,705,098) {cited in Office Action mailed 12/18/2003}.

Sullivan discloses the composition of aqueous based electro-conductive paints comprising

- a). A latex including a reactive, partially cross-linked polymer containing acidic functionality pendent from the backbone of the polymer, Carboxylic acid functionalized styrene-acrylic and styrene-maleic copolymers would meet the limitation of the polymer in the instant claims 1, 3-4, 9 and 43. (Col-5, Line-61 to Col-6, Line-43).
- b). The nickel flake and nickel flake coated with Cu, Ag, and Au meet the limitation of conductive flakes in the instant claims 1-2, 14-19 and 43 (Col-5, Lines: 9-39)

c). Coated particulate carriers such as plastic, mica, carbon and like with Ni, Au, Ag or Cu would meet the limitation of conductive particles in the instant claims 1, 7-9 12, 14-15, 18-19, and 43. (Col-5, Lines: 29-39).

d). The solvents and co-solvents would meet the limitation of instant claim- 5.

In the analogous art, Harrison et al discloses that the term 'ink' is intended to mean any material suitable for printing (page-3, line17-18) where in the viscosity of the ink ranges from 10^3 to 10^5 mPas @ 25C (Page-6) and the distinction between the ink and the paint would be viscosity, and it would be the examiners position that the conductive paint of Sullivan would meet the limitations of the conductive ink in the instant claims.

Sullivan does not teach the aspect ratio of the conductive flakes or the use of ITO as conductive particle or the acid value of the polymer in the formulation of the conductive paint.

In the analogous art of conductive inks, Suster teaches the dispersion of conductive materials such as metal flakes or graphite in to the conductive ink comprising of about 22.2 wt% lamp black and 20% by wt of organic polymer, and 15% by wt of the conductive particle being in flake form (Col-2, Line-51 to Col-3, Line-26).

In the analogous art Lochun et al teaches use of Ag, Cu, C, and Pd powders in the formulation of conductive inks, manipulation of the viscosity to suit the application. The viscosity of the conductive ink varied in the range of 10^3 mPaS to 10^5 mPaS @ 25°C (Pages- 7-8).

In the analogous art Crowhurst et al teach the use of fatty acid treated Al in making conductive inks (Page-5) and the viscosity of the conductive ink to range from 20-14,000 cps (Pages 1,2,4).

In the closely related art, Okada et al teach composition of aqueous based electro-conductive paints comprising of antimony-tin-oxide particles with an aspect ratio of greater than three dispersed in a binder of acryl-styrene copolymer and/or cellulose resin, which are the same components being used/claimed by the applicants (Col-1, Lines: 44-58; Col-8, Line-39 to Col-9, Line-5). Okada et al further teach the variation in the ratio of conductive particles, binder and solvent to attain desired composition of the ink and the distinction between the ink and the paint would be the viscosity.

It would have been obvious to one of ordinary skill in the art to make modifications to the composition of electro-conductive paint of Sullivan by optionally including both particulate fillers such as carbon and metallic flakes per the teachings of Suster to benefit from improved conductivity and performance, because Suster teaches such modifications of ink compositions, and further include other conductive particles such as ITO/ATO per the teachings of Okada et al to benefit from transparency and conductivity, and/or use the coated particles and other metallic components per the teachings of Lochun et al and/or Crowhurst et al to benefit from tailored conductivity depending on the needs of the application; and further vary the viscosity of the ink composition to benefit from improved fluidity and dispersion, because Lochun et al/Crowhurst et al are suggestive of such variation in viscosity and teach its benefits; and because all the teachings are in the analogous and related arts, and

with the expectation of reasonable success in obviously arriving at the limitations of the instant claims by the applicants.

Allowable Subject Matter

Claims 2, 6, 9, 16 and 17 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record neither discloses nor fairly suggestive of the aspect ratio of the conductive flakes and the acid number of the polymer that could be inherent by virtue of the use of commercially available polymer whose inherency could not be established with absolute degree of certainty.

Conclusion

- Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
- A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end

of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

- Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on M-Th, 07.00 - 16.30 hrs, Alt. Fri: 07.00-15.30 hrs.
- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV
May 28, 2004


Mark Kopec
Primary Examiner